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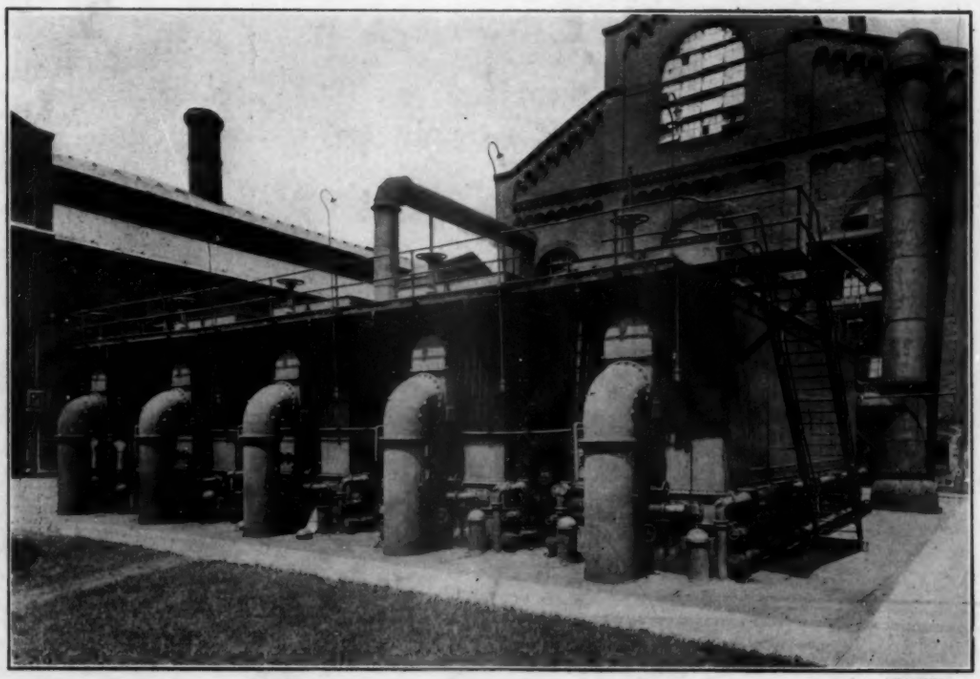

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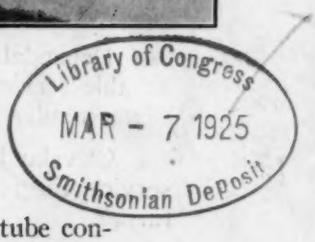

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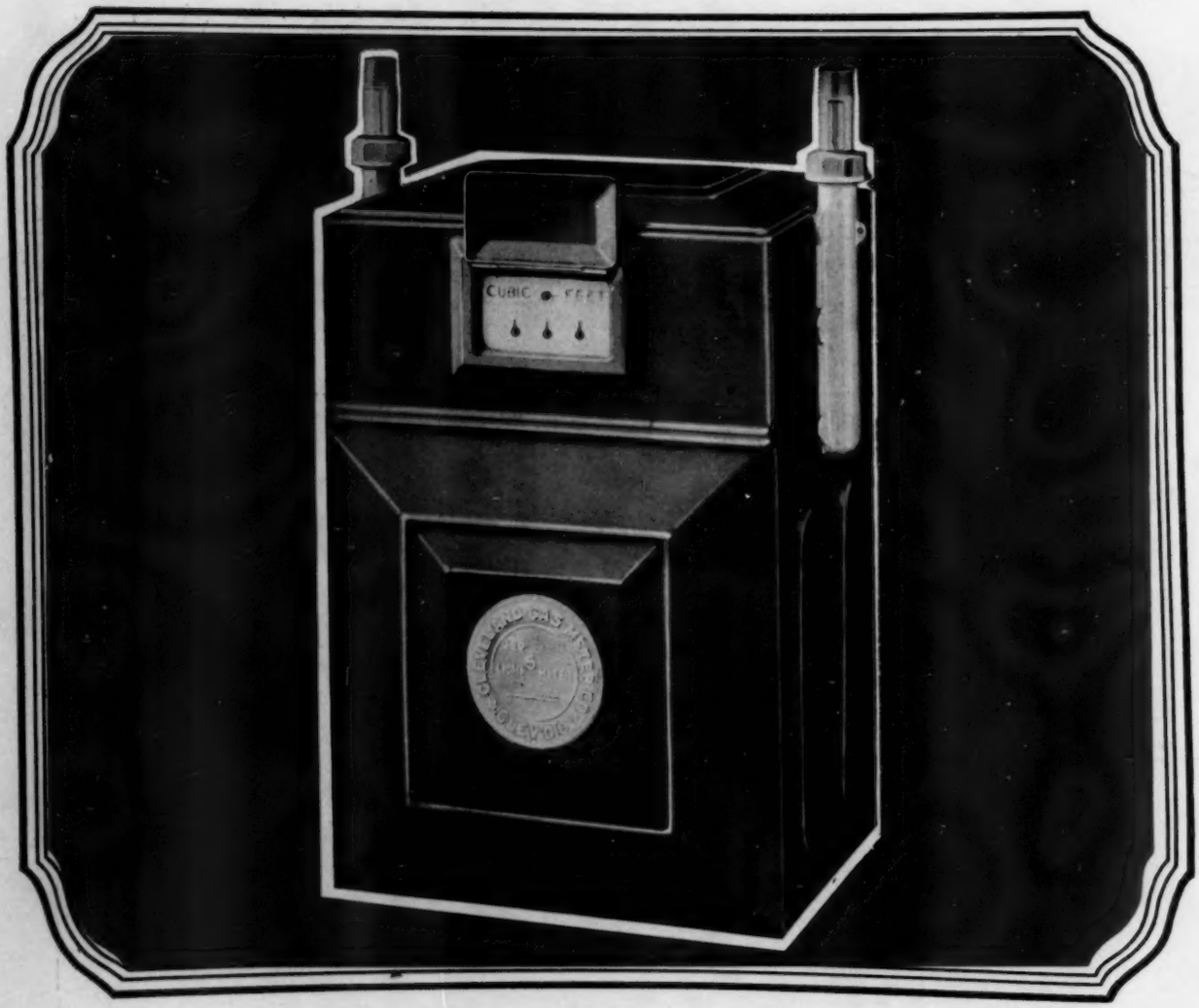
Index to Contents, Page 6

Advertising Index, Page 31



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American Gas Journal

SIXTY-FIFTH YEAR

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Contents of This Issue

Basic Gas Problems—By C. R. Prichard **177**
Oil Gas Manufacture—By Robert Lindsay and L. M. Pease.... **179**
Ideas for the Man Who Sells—By William H. Matlack..... **181**
Promoting the Use of Gas in Industry—By Charles S. Hilton.... **182**
Industrial Gas Lesson No. 59..... **183**
It Is a Winter Morning..... **184**
How The Journal Views It..... **185**
The Quest for Information
Progress in Gas Technology..... **187**
The Nature of Mixed Gas—By M. Xhygenesse **188**
Catechism of Central Station Gas Engineering, 59th Installment **189**
Current Market Prices..... **195**
News of the Gas Industry..... **196**

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GAS JOURNAL

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Basic Gas Problems*

President Prichard touches upon all important phases

C. R. Prichard

Lowell, Mass.

IT is a great privilege to me to address the members of one of the oldest associations of gas engineers at its fifty-fifth annual convention.

At this time every year we meet to discuss our problems, exchange ideas, sum up the past, take stock of the present and try to look a little bit into the future.

The Year Past

The year that has just passed has been one of varied experiences, particularly in regard to send-outs. Some companies have had about the same sales as last year, a good many, I think, ran behind, and a few fortunate ones increased; and while the cost of the principal raw materials such as coal and oil have been favorable, it was not a particularly good year for coal gas plants to receive proper return from their coke.

Most of us, therefore, have had to watch our expenditures most carefully in order to come through the year with the proper showing, but I think it is safe to say that the industry as a whole is in a very strong financial position.

For this coming year coal contracts have been made under very favorable conditions, although gas oil is at a substantially higher figure. This past winter has seen a very pleasing increase in the demand for coke, largely, but not altogether, I hope, the result of the cold weather early in December.

Gas coals have been purchased not only to meet the requirements of the gas maker as to yield, surphur, etc., but also to meet the fuel requirements of the domestic customer, who, I am firmly convinced, offers the best market for that most important product.

*Delivered at the annual meeting of the New England Association of Gas Engineers.

Coke Sales

There also has been carried on a persistent campaign to inform people as to the advantages of coke, by newspaper advertising, circular letters, bill boards and summer sales at reduced rates, and to educate them to its proper use by means of personal demonstration.

Coke sales in most cities probably average less than 20 per cent of the total fuel sold for domestic heating, indicating the possibilities of increasing the output, which, if done gradually and properly, will be at attractive figures. Companies making coal gas should give a great deal of attention to this extremely important product, whose sale price and net receipts have such a large effect upon the cost of gas.

Gas Oil

While the price of gas oil has advanced this year, and although we still have before us, as always, the statements and figures of oil experts, that the end of oil is in sight, I do not believe that we should become unduly disturbed.

There are still vast areas of this earth unexplored as to raw material, and when we realize the great quantities of oil that have been discovered in our own country during the last few years, it seems reasonable to ask what may still lie under the surface, unknown and untouched here and in more distant lands.

There are three vital problems in our business today as I see it: to decrease our cost of operation, to increase our sales and to improve our public relations.

The Waterless Holder

Last year saw, among others, two outstanding manufacturing improvements. One was the intro-

duction into this country of the waterless holder, there being now two of these holders in operation, a 3,000,000-foot holder at the Flushing plant in New York State and a 1,000,000-foot holder at Michigan City, Ind. A third is partly erected and very shortly several others will be started. It would seem that the savings in first cost, particularly on the larger holders, will be considerable, especially when we consider the matter of foundations; and the cost of maintaining and operating should be somewhat lower.

Liquid Purification

The other is the practical development of the liquid purification process so as to remove all of the H_2S, and with the entire elimination of the disagreeable odor. Moreover, this equipment without the tower can be installed ahead of existing purifiers, taking out some 80 per cent of the H_2S and about the same amount of cyanogen, the removal of the latter being an important item when we consider what may be the effect on our holders, service pipes and other fixtures if this company is left in the gas.

Sales of Gas

The industry certainly has a remarkable record in increase in sales, clearly shown if we look back a few years. From the American Gas Association records, going back to 1900, the sales of gas in billion cubic feet per year for the entire country were in round numbers:

In 1900 .....101 billion
In 1910 .....140 billion
In 1924 .....405 billion

and 1924 ran ahead of 1923 about 5 per cent, in spite of many adverse conditions.

Sales per capita were:

In 1900 .....1310 cubic feet
In 1910 .....1623 cubic feet
In 1924 .....3620 cubic feet

You will note the much greater proportionate increase in the last period than in the first.

There is still a great untouched field for gas in water heating, industrial use and house heating, and there will be a gradual and steady increase in gas used for cooking.

House Heating

House heating by gas is probably one of the most uppermost thoughts in the minds of all gas men today. Improved building construction and greater efficiency of heating plants, together with differential or special rates for gas, all are tending to bring the cost of heating by gas down near that of other fuels.

Here in New England, with our cold winters and high price of anthracite coal, the opportunities are very good and the price of gas if fixed so as to cover all proper charges ought to regulate the yearly increase in this class of business so that we can take care of it from a manufacturing and distribution standpoint. We must not forget that as the winter load, due to this business, increases, so will the summer load also increase, due to the use of gas for cooking and heating water.

The possibilities of this business and its problems reach far beyond any vision of the present day.

Industrial Gas and Electric Competition

There is one word of warning I want to say in regard to industrial business. Let us be awake to the facts of the situation as to electric competition. The electric industry has behind it all the resources in men and money of the vast electrical manufacturers, and the sales forces of central stations are going after this business in a very aggressive manner.

There is, of course, a great deal of business they cannot touch now, just as there is a good deal of business that we cannot secure at present, but there is also a great deal of business, which should be done by gas, that will be done by electricity unless our industrial engineers and manufacturers show an equal knowledge and ability, and give equal or better service in working out the most efficient solution of the heating problems in the various industries.

I believe it is necessary that we should inspect periodically all industrial burners and furnaces and see to their proper adjustment and operation. That we also should keep before our customers all improvements in furnaces and methods, for an obsolete gas furnace operating under poor service conditions will eventually be replaced by electricity.

Advertising

Advertising is one of the most important features of a sales program. We know that a large amount of space in national periodicals and in newspapers is used by the big merchants of today, together with the circular letter or pamphlet, and it may be of interest here to know that newspaper advertising in New York City last year increased 12½ per cent.

Public Relations

The matter of public relations is too big to cover in an address of this kind, but I think at the bottom of good public relations must lie the golden rule, that is, to give to others the same kind of service, courtesy and promptness we would ourselves like to receive, and also to tell our customers, without tiring them by repetition, some of the things that go on at our plants and in our distribution systems, something of our problems and difficulties, and of our constant endeavor to maintain and improve the supply for their own convenience and comfort.

The establishment of home economic departments, free maintenance labor for all appliances, and by that I mean free inspection and adjustment only, education of employees, customer and employee ownership of stock—a sound financing plan of the utmost importance to us—are all matters which no

(Continued on page 191)

Oil Gas Manufacture*

A description of the new oil gas plant at New Bedford

Robert Lindsay and L. M. Pease

DUE to the uncertainty of the solid fuel market with coal miners' and railroad strikes, it was thought that the oil gas method of manufacturing gas would be an asset to the company in that it would have a method of making gas that would not be dependent on conditions applying to solid fuel.

The investigation as to costs, using the results obtained on the Pacific Coast, seemed to bear out the assumption that oil gas could be made at a lower cost than water gas; also due to the fact that oil gas would be of lower gravity than water gas, an increased capacity of the distribution system was expected. For the above reasons it was finally decided to adopt this process at New Bedford.

The Installation

It consists of two generator shells, wash box and primary scrubber. The wash box, while of different shape, functions the same as the wash box of a water gas set. Both generator shells are 16 ft. 6 in. inside diameter of steel, the first, called the primary generator, being 44 feet high and the other, called the secondary generator, being 53 feet high. Both shells are lined with fire brick to 13 ft. 1 in. inside diameter of brick and are divded into various chambers partly filled with checkerbrick, the checkers being supported on arches. The first chamber at the top of primary is the superheat steam chamber in which the heating oil is burned, the heat being first absorbed by 2,800 checkerbrick resting on six arches. Below these arches is the primary make chamber into which the primary make oil is sprayed on 9,400 checkerbrick supported by six arches, these brick being called the primary make checkers.

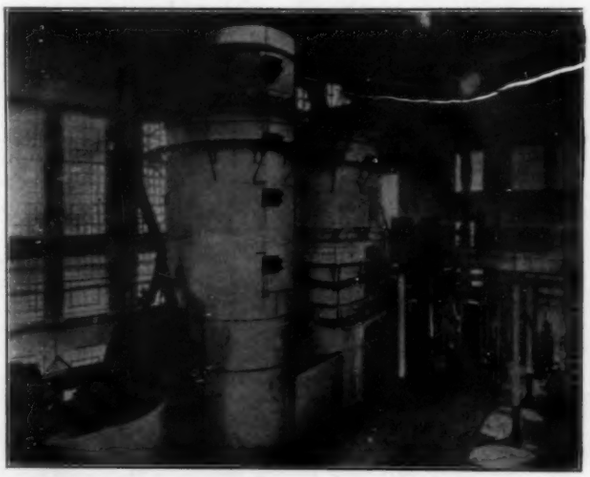
Checkerbrick Work

At the bottom of the secondary shell there are 4,400 checkerbrick supported on arches, these brick being part of the primary make checkers, as all gas made in the primary has to pass through them before leaving the machine, the gas offtake being located level with the top of these brick. Above these checkers there are six arches supporting 12,500 secondary make checkers, the secondary make oil being sprayed into a chamber above these brick. Above this chamber are arches supporting 2,000 checkers called the secondary superheat steam checkers, above which steam is sprayed during the making period. Above this chamber is a regular hydraulically operated stack valve. The gas offtake is a large rectangular brick lined connection to the dip pipe in the wash box with a large door to facilitate cleaning, as lampblack has to be cleaned out of this connection.

*Delivered at the annual meeting of the New England Association of Gas Engineers, Providence, R. I., February 18-19, 1925.

Wash Box

The wash box is elliptical in shape, the bottom being sloped towards cleanout doors at one side to facilitate cleaning out lampblack and tar. Circulating water enters the wash box through spray nozzles spaced along two 4 in. pipes inside the wash box and placed below the water level, the sprays looking downward at about 45 degrees, the object being to keep any lampblack stirred up so it will run out of the two 12 in. overflow pipes to a seal in an outside concrete overflow tank. From this tank the water and lampblack is pumped to a continuous filter to be mentioned later.



Primary and Secondary Generators

On the gas outlet of the wash box is a board slat scrubber 12 ft. diameter and 40 ft. high, the gas going up through the scrubber against the flow of cooling water, then down through an outside 24 ft. main to a Feld vertical rotary washer. This washer is built with four lower sections for water scrubbing, a still section, then two oil scrubbing sections for naphthalene removal and a still section, after which the gas goes through the usual tubular condenser to the relief holder. Salt water is used in the wash box, primary scrubber and water sections of the Feld washer.

The Filter

The filter is a wood drum half submerged in a concrete tank, to which the mixture of water and lampblack is pumped. The wood drum is fitted with 1¼ in. pipes inside, connecting from the surface of the drum to rotary valves at the trunions the drum turns on. The surface of the drum is covered with a wood grid and over this is a 14-oz. canvas cover wired on with No. 14 galvanized wire wound on

under tension to hold the canvas, the wires being spaced about 1 in. apart.

A vacuum pump supplies a vacuum of 5 in. to 10 in. through a barometric column to the rotary valves of the filter, which in turn connect with the pipes inside the filter drum and apply the vacuum to the surface of the drum. As the drum rotates, the vacuum picks up the lampblack from the mixture of lampblack and water in the tank, the lampblack staying on the canvas cover of the drum, the water going through and discharging through the barometric column to the dock.

Recovery of Lampblack

The lampblack held on the drum surface is partially dried as it is carried around on the upper half of the drum by air being drawn through it, but still contains 50 per cent to 60 per cent of water. About two feet above the water line, where the drum surface would again enter the tank, the rotary valves apply air pressure to the under side of the canvas cover to loosen the lampblack cake, after which a scraper takes off the cake and discharges the lampblack onto a belt conveyor, which takes it to a storage pile. The cleaned surface of the drum then is ready to pick up more lampblack as the rotation of the drum carries it down into the tank.

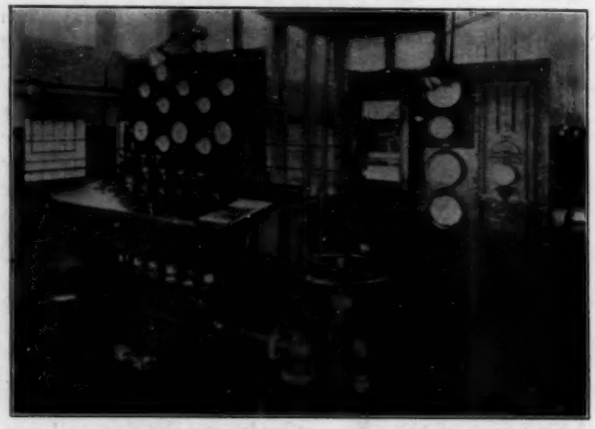
As an auxiliary to this filter a concrete tank with open top was built to filter out lampblack from the wash box water when the Oliver continuous filter was shut down for repairs. This filter tank is about 60 ft. long by 20 ft. wide by 4 ft. deep. On the bottom are laid split drain tile, then a layer of crushed stone, then a layer of sand, and above the sand wood grating to make a platform on which to stand when shoveling lampblack out of this tank. The water of the lampblack mixture filters through the sand and gravel, leaving the lampblack, the clear water going to a discharge pipe at the end of the tank.

Oil Gas Operation

To start up the oil gas set a small wood fire is built at the bottom of the primary generator, a door being provided for this purpose, the fire being gradually increased as the brick work dries out and the shells heat up. Our experience has been that even with all the draft going up through the secondary shell, the primary heats up more than the secondary, and it was not found necessary to close the stack valve and let the draft go out through the top of the primary. When the primary brick is up to about 1200 degree F. the fire at the bottom is drawn and the door bricked up and sealed gas tight. The door on the blast tee at the top of the primary shell is then opened and several bundles of small sticks thrown in and ignited. The door is then closed and a small amount of air from the blower is admitted with heat oil from the heating burners at a low rate, care being taken to see that the oil ignites and continues burning. Several heats of an hour or two each are made with an interval between heats of several hours to allow the heat to soak into the brick, after which temperatures in the primary should be about 2000 degrees F. at the top and 1600 F. at the bottom, secondary shell temperatures being about 1600 degrees F. at the bottom and 1500 degrees F. at the top, when regular gas making can be started.

Oil Gas Operating Difficulties

The oil gas set at New Bedford was started January 23, 1924, with a wood drying out fire and gas first made March 12, 1924. At first there was a good deal of trouble with pipe lines that had not been properly connected, scale in pipe lines stopping up valves and screens and Foster reducing valves that stuck due to newness, but about two weeks, gas was made continuously with a few days' shut down at times to clean out scrubber and wash box and for minor repairs. After starting to make gas it was found very difficult to control heats in the secondary shell and the quality of the gas varied from 475 B.t.u. to 750 B.t.u., with widely varying efficiencies, the best being 6.6 gal. per M. on 512 B.t.u. gas and the lowest 11.28 gal. per M. on 589 B.t.u. gas. One day a high Bt.u. gas would be made which would deposit a lot of tar in the wash box.



Operating Desk and Control Board

In reducing this B.t.u. the heats would go way up and a great deal of lampblack was made so that a thick dough of lampblack and tar had to be cleaned out of the wash box and a very tough pitch from the bottom of the primary scrubber at comparatively short intervals. As the gravity of the gas was about half that of water gas a good many complaints were received due to long flames on appliances which not only blackened cooking utensils, but due to incomplete combustion caused some cases of sickness. This condition was partially corrected by reducing the street pressure.

The Oliver filter required a great deal of attention at this time and it was also necessary to experiment with the burning of the lampblack produced, at the same time that we were learning to operate the oil gas set itself.

(Continued on page 191)

GAS MERCHANDISING

Domestic – Industrial

Ideas for the Man Who Sells

William H. Matlack

YOU CAN'T TELL THEM MUCH

NOT long ago we were talking about gas merchandising with a manufacturer's salesman and he was complaining about the failure of certain dealers to use the advertising helps furnished them by his company. "Why don't you tell 'em how good your helps are," we asked, "tell them of the results the dealers who use them are getting?"

"Tell them," he said, "tell them—well, it seems to me that is all I do, but I can't get them to use them the way they should. You know, there are so many dealers that think we are just trying to stock them up, when we start to talking about this help we can give them to move their goods, that I believe that, no matter what sales managers may say, you can't tell these dealers much."

We did not agree with this salesman, nor do we now. On the other hand, we are of the opinion that if you tell the dealer about plans that will help him move his merchandise you will make him your friend for life and some day your customer—that is, if you really have a tested plan. Some folks mistake half-baked ideas for plans and then again some mighty good dealer-helps go begging because because they are not presented in the proper manner to the dealer. It has been our experience with scores of dealers that we have talked to that they are ever hungry for ideas that will enable them to make a better window display, write a better advertisement, inaugurate a novel sales plan. They are ready to welcome any idea that will help them get a stock turnover.

On the other hand, we know of many wonderful, costly, well-laid plans that the manufacturer has devised to help the dealer that have fallen flat for the simple reason that it was left to the territorial salesman to sell the dealer the plan and the merchandise, while he merely sold the merchandise and "threw in the plan."

White Space Wins Attention

THE Illinois Power and Light Corporation is producing some advertising these days that will be seen in any newspaper, irrespective of the position it may occupy, due to the fact that the man who is doing the layout work is employing white space generously. The advertisement reproduced here is a good example of some of the company's recent work along these lines. Study them! They have been laid out with care and we suspect by a professional advertising man. White space attracts attention and it is to be hoped that with the increased advertising appropriations that we hear are being made for 1925 a great many other companies will employ advertising men to lay out and write their advertising. It has always seemed strange to us that an industry that employs specialists for every other phase of endeavor will turn an advertising appropriation over to "just whoever will take on the task," and expect it to be productive.

Your Kitchen—
Neat and Tidy
If It's Done with Heat You Can Do It Better with Gas.
Gas is clean—the gas equipped kitchen does not cry out for a dusting cloth and a mop.
There is no kindling to bring in and no ashes to carry out.
A gas fire in the kitchen can burn all day long and yet you find the floors and woodwork bright and clean.
Your neighbor can tell you how easy it is to keep a kitchen neat and tidy when gas is used for cooking.
For clean heat—gas is best.
ILLINOIS GAS SERVICE
Bridge 1041
Illinois Power and Light Corporation
414 Missouri Ave. East St. Louis, Ill.

Promoting the Use of Gas in Industy*

Some thoughts for gas company executives

Charles S. Hilton

Blackstone Valley Gas & Electric Company, Pawtucket, R. I.

THE purpose in presenting this paper on the promotion of gas as the fuel of industry is not so much the hope of offering new ideas on the subject—we have enough ideas now if they are properly applied—as it is the desire to place before a group of men representing the gas company executives of New England a new view of some ideas already advanced, to show you the problem of industrial gas development as your own engineers on the firing line see it in their daily contacts with the industrial consumer and prospective customer.

The Gas Company a Monopoly

Let's start with ourselves. The statement is made, accepted by the company, improperly stressed by a certain class of individuals, that the gas company is a monopoly. Now that word usually leaves an unfavorable impression upon the public mind, and it is bad enough to have to start with that handicap without adding to it a misunderstanding on our own part of our position. We are a monopoly, but, in what? In the business of supplying gaseous fuel to our respective communities. The principal use of our fuel in industry is to produce heat. Have we a monopoly of the business of supplying heat to the industries in our territory? Far from it. We are met with the closest kind of competition. So the problem of developing the industrial use of gas, like that of many other methods and materials used in industry, becomes strictly an economic one, a quesion of giving the greatest results per dollar of cost.

According to the Industrial Section of the American Gas Association, there are three phases to our problem—its relation to utility executives, to the customer and the public, and to engineering improvements. The first phase is the one which we will touch on here.

The Gas Rate

That our fuel provides the best method of supplying heat there can be no question. And in a great many cases its overall cost of utilization is lower than that of other fuels which cost less to buy, but generally much more to use. Your industrial engineers use every available means to bring this before their prospects, but in almost every community there is a considerable amount of industrial business which is just beyond their reach after all the advantages of gas are credited to it. Now we know that our industrial customer, our really profitable customer, is carrying more than his fair share of the burden under the antiquated system of rates used by most gas companies. Here is a situation worthy of the attention of every executive in the room. It is a problem which every man can solve for himself. The instrument is available, the two or three part rate.

Advertising

As to the relation of industrial gas to the customer and the public, the main story is publicity and then more publicity. Advertise! Tell people what you can do, and what you have done. Go as far as you can beyond what is actually required of you in serving your industrial customers. Your engineers go as far in this respect as they are permitted to go. Encourage them all you can. Remember that the big industrial man's friends and associates are also big industrial men, and that one complaning customer will hurt your company more than ten satisfied customers will help.

Heating Calendar Rolls

One case in point is that of the application of gas to the heating of calendar rolls in a plant in Pawtucket. These rolls had prevously been heated by steam. Condensation of the steam inside the rolls limited the temperature that could be reached. When gas was applied as the heating agent, the application was made in such a manner as to bring the temperature up to the highest safe temperature, thus materially speeding up the production and giving the machine an output greater than would have resulted otherwise. Floor space and other savings resulting were great enough to more than offset the cost of gas.

Some Interesting Figures

The main contributing factors towards the sale of ten large heat-treating gas furnaces were the low cost of upkeep and infrequent adjustments, combined with the actual cost of the fuel. High pressure gas was used with a single control maintaining a 12-pound pressure regardless of the number of furnaces in operation. A lead furnace which formerly took from 90 to 115 minutes to be brought up to heat is now doing the work in 30 to 40 minutes. A cyanide furnace does in one hour work that previously required two and one-half hours. A high speed steel furnace reaches 2,300 degrees F. in one hour. This formerly required three hours. It was estimated that a 10 per cent saving in fuel costs would be made and with the best data available at

(Continued on page 192)

*Delivered at the annual meeting of the New England Association of Gas Engineers.

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 59

Change of State *(continued)*

Another Form of Problem

Still another form of problem is the following: It is desired to find out how many pounds of a certain number of substances will be heated up 10 degrees F., with the heat that is contained in a mass of water of ten pounds which is raised from 40 to 200 degrees F. The various substances that are mentioned in this problem are as follows:

Glycerine from an initial temperature of 100 degrees F.

Sea water from an initial temperature of 50 degrees F., the density of the sea water being 1.045.

Copper from an intial temperature of 25 degrees F.

Glass from an initial temperature of 60 degrees F.

Gasoline from an initial temperature of 20 degrees F.

The same general formula is used in this problem.

Heat is equal to specific heat $\times$ weight $\times$ temperature differential. In this case every term in the equation is given with the exception of the weight of the substance, which may be assumed to be y.

Then the equation takes on the following forms for each of the cases in the problem, after it is first determined that the heat in changing the temperature of one hundred pounds of water from 40 to 200 degrees F., a temperature rise of 160 degrees F. is equal to: $160 \times 10 \times 1$, or 1600 B.t.u. The specific heat of water is assumed to be unity, and from the tables the specific heats of the different substances above are as follows:

Glycerine	0.6120
Sea water	0.95
Copper	0.0951
Glass	0.1937
Gasoline	0.5332

The equations are:

$1600 = y\ (0.6120)\ (110 - 100)$.
$1600 = y\ (0.95)\ (60 - 50)$.
$1600 = y\ (0.0951)\ (35 - 25)$.
$1600 = y\ (0.1937)\ (70 - 60)$.
$1600 = y\ (0.5332)\ (30 - 20)$.

Solving these equations for y, there are obtained the following:

$$y = \frac{1600}{0.6120 \times 10}, \text{ or 261 pounds of glycerine.}$$

$$y = \frac{1600}{0.95 \times 10}, \text{ or 178 pounds of sea water.}$$

$$y = \frac{1600}{0.0951 \times 10}, \text{ or 1780 pounds of copper.}$$

Ten Pounds of Water
10 Pounds of Water in varying Temperatures raised from 40° to 200°F will require 1600 B.T.U.
This Heat will raise the Temperature 10 degrees F. of the following
261 Pounds of Glycerine
178 Pounds of Sea Water
1780 Pounds of Copper
825 Pounds of Glass
302 Pounds of Gasoline

$y = \frac{1600}{0.1927 \times 10}$, or 825 pounds of glass.

$y = \frac{1600}{0.5332 \times 10}$, or 302 pounds of gasoline.

It Is a Winter Morning

How gas serves man

THE faithful alarm clock, with mechanism as true as only gas treatment could make it, awakens you. Your gas-heating plant under automatic temperature control has given your home a temperature of 70 degrees. You arise from a gas tempered bedspring on which you have enjoyed a restful night's sleep. You enter the bath, every one of whose fine fittings has been made possible by gas.

There stands the bath tub, whose glistening enamel finish is the product of a gas-fired furnace; the fixtures and the shower, which have been gas treated; finally the mirror silvered by gas, and the little accessories that add a final touch of elegance to the bathroom appointments. All are set in the beautiful scheme of floor, wall and ceiling, the very tiles of which have been glazed and finished by gas.

Hot Water by Gas

From faucet and shower spray comes a wealth of hot water from your automatic gas water heater. And now the shave—made a pleasure by gas-tempered razor and blade, by brush set in gas-vulcanized handle, and that final touch of cooling lotion, made possible by gas by-products.

Again you enter the bedroom to dress. It may interest you to know that many ingenious gas appliances have entered into the production of your suit and shoes. Even your finest linens have come under gas treatment and, over all, their colors have been made possible through dyes which are the product of gas by-product distillates.

Food Cooked with Gas

And now for the real joy of the morning, a steaming hot breakfast, prepared on a gas range. More than that, the lowly gas has been your caterer. Through its use your fruit has been ripened, your cereal cooked and prepared for your pantry shelf. Your coffee has been roasted, your meats smoked, your bread baked, your cream pasteurized. Gas, the caterer, has supplied you with the finished table service. Gas has plated your silver, glazed your china, melted and formed your glassware, and "fired" the beautiful designs and color schemes of the cream service.

It is left to gas to add that last touch, the morning paper, to the perfect breakfast. Through the night, gas has melted the stereotype and linotype metals that have formed the type and cuts of your morning paper. And now there are your hat, gloves and umbrella, all of which have been produced with the aid

Gas
In the Service of
Man
SHAPES AND IRONS HATS
MAKES GLASS AND SOLDERS WIRE
CONDITIONS TOBACCO
BAKES PIPE STEMS AND MOUNTS
ENAMELS AND SOLDERS CUFF-LINKS
MELTS, ANNEALS AND SOLDERS METAL IN JEWELRY
DRIES AND IRONS SILK FOR TIES
SINGES, STRETCHES AND FINISHES WOOLENS AND OTHER CLOTH
DRIES, WASHES AND STERILIZES CANVAS AND HORSEHAIR SUIT LININGS
CONDITIONS WOOL AND SINGES YARN FOR SOCKS
MELTS PARAFFIN FOR SHOE LACES
HEATS TOOLS AND MELTS GLUE IN BOOT AND SHOE MAKING
HEATS SHAVING WATER
SINGES COTTON YARN FOR COLLARS
SINGES COTTON GOODS FOR SHIRTS
WASHES IRONS AND MANGLES SHIRTS
MATURES HOTHOUSE FLOWERS
BY-PRODUCT TAR YIELDS DYES FOR TIES AND HANDKERCHIEFS
USED IN ALL STEPS IN MAKING FOUNTAIN PENS
MELTS GOLD FOR RINGS
TEMPERS STEEL, MELTS GOLD AND FIRES GLASS
HEATS TYPE METAL IN PRINTING, DRIES PAPER PULP
SHAPES, DRIES AND IRONS GLOVES
BENDS AND DRIES WOOD FOR WALKING STICKS
MELTS METAL FOR STICK MOUNTS AND FERRULES
PRESSES CLOTHES

of a gas-fired steam boiler. In the garage you find that the gas garage heater has kept the temperature

(Continued on page 186)

As The Journal Views It

THE QUEST FOR INFORMATION

Every growing industry, every enterprise that is desirous of progressing, becoming larger, improving its manufacturing and merchandising operations, enhancing the service that it gives to its customers, in fact, every undertaking that wants to get ahead is on the constant lookout for information. The quest for information is as extensive as industry itself.

This is as it should be. In our own industry, the desire for information, for knowledge that will enable gas men to enter fields where gas is not now used, is very strong. Our field is becoming larger and larger and we are finding that we now require information that was entirely unnecessary only a few years ago.

Of course, it will be said that the mere knowledge of what to do does not imply the ability to perform the task. It is very well to have a large fund of information, but it is of even greater importance to know how to use it. It is to the credit of the gas industry that it has always shown in a marked degree the ability to make practical use of the knowledge that it possessed.

It is a fact that the gas industry today needs more information than ever before in its history, and the question arises, where is it to get this information? How is it to find out how to do the thnigs so as to obtain new business or to hold old business or to improve its processes, no matter what they are?

The gas industry is fortunate in having one means of securing this information, that is, through the meetings of the state gas associations throughout the country and of the national association once a year. The fund of information that is made available in these meetings is tremendous. All phases of the gas industry are discussed and there is no gas man, it may be said, who is not ready to give his fellows the benefit of all his experience and knowledge about any particular problem that may be brought up at these meetings. The associations that exist in the gas industry surely perform that prime function for which they were founded, the mutual help of one another in the solution of common problems.

Trade papers also play an important role in this quest for information. They are the means by which information is universally disseminated among gas men. A trade paper that does not yield to its readers the latest of information on all subjects pertaining to their industry, does not fulfill its essential purpose. It must tell them everything of importance that is going on. In the gas field this is a particularly difficult task, because of the great variety of interests that exist therein.

There are many separate departments in a gas company, each of which possesses characteristics of its own. As far as The American Gas Journal is concerned, every effort has been made, is being made, and will continue to be made, to supply all gas men, no matter what they are interested in, with current and pertinent information regarding their particular work. The paper has been departmentalized, particularly for this reason, so that those who read it may know where to look for matters of interest to them.

The technical man, the commercial man, the publicity man, the advertising man, the industrial salesman, the engineer and the accountant, in fact, each and every member of the gas industry—no matter what particular line of work he may be following—will find matters of interest to him in The American Gas Journal from time to time. It has been aimed to make this Journal a paper for all gas men, to include in it material not only that they will want to read, but that they will be glad to cut out and save for future reference.

All these forces are working toward the common end to help the gas industry reach its goal. It is a hard road to travel—no one will deny—and any assistance that can be given to make it easier is surely a direct agent in bringing our industry closer to accomplishing the great aim that it has set for itself.

IT IS A WINTER MORNING

(Continued from page 184)

just above freezing and you start your engine without trouble. As you admire the lines and finish of your car, and listen to the rhythm of the engine's perfect performance, you probably do not give a thought to the fact that gas has japanned the body block-tested the engine, heat-treated the gears, the shifting lever and other wearing parts, and vulcanized the tires.

Gas in Industry

You are soon on your way toward the city, and as you motor down the boulevard you are attracted by the lighting system, automatic traffic controls buildings, bridges and other structures, with their thousand and one units and details of steel, bronze, copper, brass and other metals. But you fail to see behind them all the men at the gas plant who are making possible the supply of fuel that has produced these, in whole or in part.

You are now at your office building, and as yet cannot elude the many evidences of the ever-present gas. The mahogany finish of your steel office furniture, the clattering typewriters, the adding machine, the binders of your business forms, your check perforators, your engraved stationery, your pens and even the pins and clips, have called upon this wonder fuel in their production.

It is noon, and you leave for lunch. Only heavy-duty gas-fired restaurant appliances made it possible for you, among those hungry thousands, to secure an appetizing meal within reasonable time. You have absolute faith in the sanitation of that busy restaurant, feeding hundreds of varied types of people, for gas has made possible perfect sterilization of dishes and utensils. You hurry to your office, pausing for a moment to pay your check with money whose specie has been melted by gas and formed into coins. The gas-treated cash register has recorded the amount of your check.

Gas on the Railroad

In the late afternoon you leave your car in the city for some minor repairs and hasten home on the suburban train. The locomotive whose giant tires, babbitt bearings, brass journals and other wearing parts are but other products of the versatile gas, quickly rushes you to your suburban home.

You are very proud of that home, with its warm-hued composition roofing tile and terra cotta trimmings, nicely tinted paints and varnishes glistening windows and its detail of builders' modern hardware. It is here that gas has been your architect and decorator.

At Home Again

And then the pleasant evening at home; dinner, a cozy living room, a comfortable chair, the glow of the hearth, a book. Gas is the enchanter. Gas has given to that room the stains and varnish of woodwork and furniture. It has shaped the design of chandelier and electric light bulb. The radiant type heater casts upon the room all the warmth and glow of the open fireplace.

The day has drawn to a close, yet we have touched upon only a few of the thousands of uses of gas. What of the telephone, the radio, and the multitude of industrial uses, some five thousand in number? Throughout his life there is scarcely anything which man uses in which gas has not played its part. Think it over.

SALES THAT MAKE MORE SALES

The salesman who is a student of selling knows that all sales are not alike.

He knows that the value of certain sales are hard to over-estimate. The salesman who realizes this fact is a strategist.

Experience has proven, for instance, that a sale of a gas range to the leading family in a town is worth more than a sale of five or ten ranges to ordinary families. The reason is obvious. The sale to the leading family brings more sales in its wake and adds prestige to the range. It's the old story, "Get the Bell Wether and You've Got the Flock."

Now, the salesman who knows the worth of his own time apportions that time in accordance with the value of the sale. He knows he can afford to devote more time to a sale that will get him in right in a neighborhood than to an ordinary sale.

A good example of this discriminating power of a salesman was exemplified by the Walter E. Hill Company, of Baltimore, Maryland. The city officials wanted to buy a gas range for the kitchen of the new Stadium. Only one gas range was needed, but the Walter E. Hill Company realized that here was a sale that meant more sales. So every effort was devoted to selling the committee in charge of the purchase the Roper Gas Range.

Perhaps there is no one place in the United States outside of Washington where more notables are gathered together at one time than at the Stadium during the Army and Navy game.

Because of this fact, it is a matter of great pride to the Walter E. Hill Company to have the range they sell selected for the Stadium kitchen.

UTILIZING THE CHEAPER FUELS

The feasibility of using cheaper bituminous coals in place of Eastern coal or coke in the manufacture of carburetted water gas has been demonstrated as the result of tests conducted at Streator, Ill., and other places, by the Department of the Interior, in co-operation with the Illinois Geological Survey and the University of Illinois.

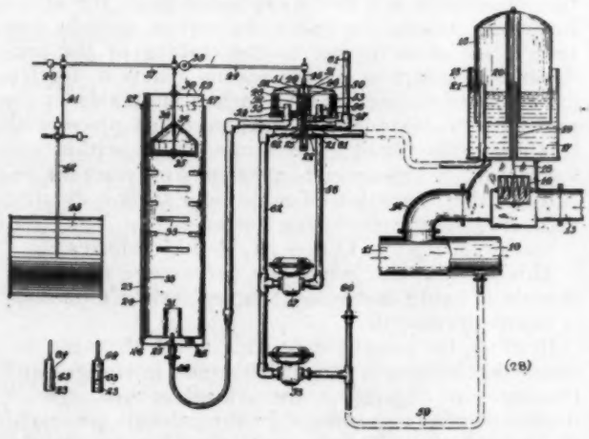
The matter is of considerable economic significance to gas manufacturers in the central and western states, as the substitution of the cheaper grades of high-volatile bituminous coals in place of fuel mined hundreds of miles away from the plant allows substantial savings in manufacturing costs.

PROGRESS IN GAS TECHNOLOGY
Domestic and Foreign

MANUFACTURE OF GAS

THE apparatus that is shown in the accompanying illustration and that is the subject matter of British Patent No. 219,059, is concerned with the manufacture of gas in which the main object is to control or maintain constant the heating value of combustible gas.

The object is to control or maintain constant the heating value of combustible gas or other fuel. A measured supply is delivered to a calorimeter, and the heating value of the gas is caused to vary the composition of the gas as required. A pipe 10 receives a supply of coal gas from a pipe 11 and a supply of water gas from a pipe 12, the latter being controlled by a valve 14. The valve 14 is actuated by a bell 15 floating in liquid 17. The bell carries a central tube 20 enclosing an upstanding tube 19, and the actuating rod 16 passes through both tubes, so



that it is liquid sealed. A calorimeter 24 carries a burner 25, and is provided with an internal casing 28 closed at the top and having perforations 30 for the escape of combustion products. Air for combustion is preheated by passing through the jacket 33, and the combustion products are mixed by means of baffles 38 before reaching an expansible capsule 35. The movements of the rod 34 of the capsule are transmitted through a rod 37 pivoted at 39, and rod 41 to a recording pen 42 moving over a drum 43.

The lever 37 also operates a bell 46 floating in a tank 48 and carrying a valve 23, a liquid seal being provided similar to that for the valve 14. The bell 46 moves in an annular chamber connected by a pipe 54 to the central chamber. The function of the bell 46 is to supply a positive or negative loading to the capsule 35, but it does not operate the valve 23 independently. The mixed gases are supplied from the pipe 10 through a pipe 59 and pressure-equalizing devices 58, 57, to the pipe 56, bell 46, and thence to the burner 25. The bell 46 is thus sensitive to changes in density of the gas, or to changes in atmospheric pressure. The function of the valve 23 is to act as a relay, and admit the gas through a pipe 21 to operate the bell 15 controlling the main valve 14. The portion of water gas supplied through the pipe 12 is thus regulated according to the heating value of the gas as measured by the calorimeter.

REMOVAL OF H_2S FROM GAS

THE results of a study of conditions affecting the activity of iron oxides in removing hydrogen sulphide from city gas are given in Technical Paper 332, just issued by the Department of the Interior through the Bureau of Mines.

Gas purification is a subject of perennial interest to the gas industry. This interest is intensified by the fact that the purification methods now in general use limit the gas industry to the use of selected low-sulphur coals and oils for making gas. Iron oxide, the agent generally used for purifying gas, is often so variable in quality and uncertain in action that only by constant vigilance can the gas works at all times comply with the provisions of the law.

It has been recognized for several years that gas purification by the use of iron oxide is a more complex problem than it would appear to be at first. The fact that a particular material with a high iron oxide content may without apparent reason be inferior or even worthless for gas purification is evidence that iron oxide content alone is no criterion for judging the purifying value of a material.

Other chemical determinations, such as water content, have been suggested in conjunction with iron content as indices of oxide quality, but tests have shown that no general rule applies to all cases. It may be said, therefore, that the only guide to the purifying quality of an oxide is what the oxide will do when subjected to actual sulphiding, under conditions approximating those that obtain in practice.

Several tests have been devised for estimating the purifying value of iron oxides from the amount of hydrogen sulphide that they are capable of decomposing under certain prescribed conditions. In some tests the sulphiding of the oxide is brief and intensive, making necessary the use of pure hydrogen sulphide. In other tests the sulphiding is much slower, the constant of hydrogen sulphide being the same as in practical operation, but the rate of gas flow much higher.

In either kind of test, factors causing uncertainty are introduced, but it is obviously impractical to duplicate plant operation, wherein sulphiding with a single batch of material extends over months or even years under conditions that vary widely. A labora-

tory or semi-laboratory test must be more or less intensive to permit its completion within a reasonable time, but it must be conducted in such a manner that, where conditions cannot be controlled, their effects can at least be predicted. The purpose of this paper is to report the determined effects of some of these variable conditions upon the behavior of oxides used in purifying gas.

Although the work described in this paper, the result of a co-operative arrangement between the Bureau of Mines, the Illinois State Geological Survey and the Engineering Experiment Station of the University of Illinois, has demonstrated the effects of certain conditions on oxide activity, the authors do not claim that their method will definitely indicate the ultimate value of a fresh sample of an unknown material. Activity is changeable and is affected by many conditions. The method can be used, however, to compare the activity of one material with the activity of another at the time of testing. It seems likely, also, that the method is well suited for determining the purifying value of an oxide at different stages of its active life.

The Nature of Mixed Gas

A few important points regarding its production and use

M. Xhygenesse

(The article that follows is an original contribution from a man who is well known in the gas industry in France, being a professor in the College of Industrial Heating. The practical value of this article is evident, for it contains information of moment in reference to the operation of gas generators. The article goes into the chemical side of the matter and shows by numerous calculations and mathematical derivation the real nature of the processes that take place therein. The article is taken from the French journal, Chaleur et Industrie, and is translated especially for the American Gas Journal.—Trans.)

THE production of gas from carbon, that is, the gasification of carbon, takes place in accordance with the following fundamental formula, when the air used is absolutely dry:

$$C + \tfrac{1}{2}(4N_2 + O_2) = CO + 2N_2 + 29.45 \text{ calories.}$$

In other words, this is an exothermic reaction. On the other hand, when water vapor is passed through a hot incandescent bed of carbon, it decomposes into hydrogen, and carbon monoxide is also formed according to the following equation:

$$C + H_2O = H_2 - 28.65 \text{ calories.}$$

This reaction is enodthermic, absorbing heat with the formation of water gas.

As a result of these two reactions, when a jet of steam is introduced into a producer which is being operated with dry air, a gas is obtained which is a mixture of air gas and water gas, and for this reason it is called mixed gas.

Nature of Mixed Gas

An analysis of the mixed gas will show that the percentage of carbon dioxide and hydrogen in the gas has been increased, while that of carbon monoxide and nitrogen has been decreased. The increase in the hydrogen content and the decrease in the nitrogen content are easily explained from the above formulae, and the fact that the carbon dioxide content is increased is due to the chilling of the producer by the action of the second reaction, for the dissociation of this gas into carbon monoxide in the presence of incandescent carbon takes place with less ease, the lower the temperature within the apparatus. Furthermore, a secondary reaction results in the formation of additional carbon dioxide, according to the following formula:

$$CO + H_2O = CO_2 + H_2 + 10.1 \text{ calories.}$$

This means that, while the percentage of carbon dioxide is being increased, that of carbon monoxide is being decreased.

It must be remarked at this point that the increase in the proportion of hydrogen in the gas and the decrease of the amount of carbon monoxide in it produces inverse effects on the calorific power of the mixed gas. Then, again, the increase in the content of nitrogen and the diminution in the carbon dioxide content also have inverse effects on the temperature of combustion. Furthermore, the gasification of carbon by means of air adds heat to the generator, while the gasification of the carbon by means of steam detracts heat from the generator. It, of course, follows that if the producer loses more heat than it receives, then it will finally be extinguished. There is thus a maximum amount of steam that can be blown into the generator per given weight of air used in the apparatus.

It is these variations in the calorific power, the temperature of the gases, the temperature of combustion as well as the utilization of the combustible that form the subject matter of this study.

Maximum Steam Per Given Amount of Air

It is supposed that the combustible matter is carbon and that the gas is formed in accordance with

(Continued on page 193)

Catechism of Central Station Gas Engineering in the United States

Installment No. 59

(Continued from last week)

Pressure Problem

304. In delivering water through a pipe laid up a hill, the pressure is greater at the bottom than at the top. Why?

With illuminating gas the pressure is greater at the top. Why?

If the pipe containing the illuminating gas were tightly and rigidly sealed throughout, so that the pressure of the air had no effect upon it, would the pressure within it be greater at the top or at the bottom? Why?

Ans. "In the question the word 'Pressure' is used to express a difference between the pressure of the atmosphere and the pressure within a pipe is measured on a U, or syphon gauge. This is 'pressure' in a gas manufacturing sense, but not **actual** pressure. For when a syphon gauge connected to show the pressure, if any, on the gas in a hydraulic main, shows the water in each leg at the same level, we say there is no pressure in the main, though in truth there is the same pressure in the main and on the water leg of the syphon connected to it, as on the leg open to the atmosphere, that is, 'atmospheric pressure,' about 15 lb. per square inch.

Delivering Gas Through a Pipe

"In delivering illuminating gas through a pipe laid up a hill, the action of gravity will cause the **actual** pressure in the pipe to be greater at the bottom than at the top, by the pressure due to the weight of a column of gas of the same vertical height as the hill. But on testing with a syphon, or other similar gauge, the **indicated** pressure will be greater at the top than at the bottom. This apparent paradox is due to the fact that what the syphon gauge indicates is not the actual pressure in the pipe, but is the difference between this pressure and the pressure of the atmosphere at the same level. The atmospheric pressure diminishes with the elevation, so that at the top of the hill it is less than at the bottom by the pressure due to the weight of a column of air of the same height as the hill. This is also true of the gas in the pipe. But as air is heavier than illuminating gas, the atmospheric pressure will diminish more for the same elevation than the pressure of the gas will diminish. Therefore the syphon gauge, which indicates the difference between these pressures, will show a greater difference at the top than at the bottom of the hill.

"In delivering water up a hill the law is the same. The actual pressure in the pipe will be greater at the bottom than at the top by the pressure due to the weight of a column of water of the same vertical height as the hill. The apparent pressure at the bottom, if measured by a syphon gauge, would be the actual pressure less the pressure of the atmosphere, and the same is true of the gauge pressure at the top of the pipe. But as the water is very much heavier than air, the apparent, or gauge, pressure will remain greater at the bottom than at the top.

"If the pipe containing the illuminating gas were tightly and rigidly sealed throughout, the actual pressure at the bottom of the pipe would be the same as at the top, plus the additional pressure due to the weight of a column of gas of the same vertical height as the hill. Gas in a rigidly sealed pipe is free from all outside influence, except that of the attraction of gravitation."

Absolute Pressure of Gas

305. A stand pipe 100 feet high is filled with a gas which is lighter than air. The pipe is rigidly and hermetically sealed so that there is no communication between the air outside and the gas inside. Will the absolute pressure of the gas be the same at the top and at the bottom of the pipe? If the pressure is not the same, at which point will it be greater? Give the reasons for your answer.

Ans. The only forces affecting the pressure in a pipe filled with gas and hermetically sealed are the attraction of gravity and the pressure of the gas itself; that is, the force with which it presses against the sides of the pipe. According to the molecular theory of the composition of matter, this pressure which is exerted against the sides of the containing vessel by a gas is due to the incessant striking against these sides of molecules, each of which is trying to get as far away as possible from the others. In the absence of any disturbing force this pressure is exerted equally in all directions, since all the molecules move with the same velocity and have the same weight, and consequently possess the same energy, and as many travel up as travel down or sideways; and if the gas was imponderable, that is, had absolutely no weight, the pressure would be the same at all points in the height of the pipe. But each molecule has some weight and therefore tends, under the influence of the attraction of gravity, to move downward. This tendency to move downward decreases the velocity of the molecules moving upward, while it increases that of those moving downward, and since the force with which the mole-

cules strike against the sides of the pipe or against each other depends upon the velocity with which they move, the molecules moving upward do not strike as hard, and therefore do not exert as much force or pressure as those moving downward. The difference thus produced between the upward and downward pressure is in every case equal to the weight of the molecules. As, owing to its weight, each molecule from the top down transmits a greater downward pressure than it receives from the molecules above it, the effect is cumulative, and the total pressure at the bottom of the pipe will be greater than that at the top by an amount equal to the weight of the gas in the pipe, and the pressure per unit of area will be greater at the bottom than it is at the top by an amount equal to the weight of a column of the gas of unit area and of the height of the pipe.

The same reasoning applies to the air in the earth's atmosphere, the pressure of which is greatest at the sea level and diminishes with the height above this level by an amount equal to the weight of a column of air of unit area and a height equal to the elevation of any given point above this level.

Absolute Pressure Problem

306. The answer to question No. 305 shows that in a vertical pipe filled with a gas lighter than air the absolute pressure at the lower end of the pipe is greater than that at the upper end. Will the same relation hold if the pressures shown by syphon gauges are taken, instead of the absolute pressures? Give the reasons for your answer.

Ans. The gauge pressures at the two ends of a vertical or inclined pipe filled with a gas lighter than air do not bear the same relation to each other as do the absolute pressures, the gauge pressure at the top being higher than that at the bottom instead of lower. This difference in gauge pressure between the top and the bottom of an inclined pipe is due to the facts that the syphon gauge does not show the actual pressures, but only the difference between the actual pressures exerted on each leg of the gauge and that the actual pressure of both the outside air and of gas at rest in a pipe decreases in proportion to their weight as the distance of the point of observation from the center of the earth increases. The actual pressure of both air and gas at the top of the pipe will be less than at the bottom by an amount equal to the weight of a column of air or gas of unit area and of a height equal to the difference in elevation between the two ends of the pipe. As the gas is lighter than air, the weight of the column of gas will be less than that of the column of air. Therefore, the actual pressure of the gas will decrease less than the actual pressure of the air, and consequently the difference between the actual pressure of the gas and that of the air will increase with an increase of elevation. The lighter the gas, that is, the lower its specific gravity, the smaller will be the decrease in its absolute pressure and the greater the increase in the gauge pressure for any given increase in elevation.

The amount of this increase can be obtained for any particular case by dividing the difference between the weight of a column of air with an area of one square inch and a height equal to the difference in elevation between the two ends of the pipe and that of a column of gas of the same area and height by the weight of a cubic inch of water. For a gas with a specific gravity of 0.700 and for a difference of elevation of 100 ft. between the two ends of the pipe, the calculation would be as follows:

The Calculations

The height of the columns of air and gas will be 100 ft., or 1,200 in., and as the area of the columns is one square inch, the volume will be 1,200 cubic inches. A cubic foot of air weighs 0.076357 lb., and a cubic inch weighs $\frac{0.076357}{1728} = 0.00004418$. 1,200 cubic inches of air, then, weigh $0.00004418 \times 1{,}200 = 0.053016$ lb. Since the specific gravity of the gas is 0.700, the column of gas will weigh 7-10 as much as the column of air, and the difference between the weight of the column of air and that of the column of gas will be equal to 3-10 the weight of the column of air, or to $0.053016 \times 0.3 = 0.0159048$. The weight of a cubic inch of water is 0.036 lb. and the increase in pressure will therefore be $\frac{0.0159048}{0.036} = 0.44$ in. Thus a gas with a specific gravity of 0.700 will show an increase in pressure of 0.044 in. for each 10 ft. increase in elevation, or an increase of 1-16 in. for each 22.7 ft. of rise.

In the same way we find that a gas with a specific gravity of 0.600 will show an increase in pressure of 0.059 in. for each 10 ft. of rise, or an increase of 1-10 in. pressure for each 17 ft. of rise; gas with a specific gravity of 0.500 will show an increase of 0.073 in. for each 10 ft. of rise, or an increase of 1-10 in. for each 13.6 ft. of rise; gas with a specific gravity of 0.400 will show an increase of 0.088 in. for each 10 ft. of rise, or 1-10 in. for each 11.3 ft. of rise, and gas with a specific gravity of 300 will show an increase of 0.103 in. for each 10 ft. of rise, or an increase of 1-10 for each 9.7 ft. of rise.

Practical Pressure Problems

307. Part of the district supplied by a gas company is 135 ft. higher than the works. The gas distributed is a mixture of coal gas and carburetted water-gas having a specific gravity of 0.550. There is practically no flow of gas through the pipes supplying this portion of the district between the hours of 1 o'clock and 5 o'clock a. m. During this time the pressure at the outlet of the street main governor at the works is 15-10. What will be the pressure at the 135 ft. level?

(Sixtieth Installment Next Week)

OIL GAS MANUFACTURE

(Continued from page 180)

Condition of Arches

On May 16 it was found necessary to shut down for repairs to the door on top of the primary blast tee and on taking this door off and looking down into the primary generator it was found that two of the arches supporting the primary superheater checker brick had fallen with the checkers they supported into the make chamber below.

The set was shut down and cooled off and when it was cool enough to enter it was found that all the arches excepting those at the bottom of the shells forming the gas passage between shells had sagged so much that it was decided to rebuild them all. The inner course of lining brick was loose and cracked in places and in the top of the primary generator had partly fallen. The brick did not appear to be fused except in several places in the secondary make checkers.

The pyrometer located in the secondary make checkers was never higher than 2200 degrees F. and as far as we can tell this is the highest temperature reached. As many of the old brick were saved as possible and used with new brick in rebuilding the arches. When several of the old brick were piled up and compared with a similar pile of new brick of the same make it was found that a considerable shrinkage had occurred in the brick that came out of the arches.

Apparatus Restarted

As soon as repairs were completed a drying and heating fire of wood was started and on September 15 we started making oil gas again. Before starting, the seal on the wash box dip pipe was decreased from 13 inches to 10 inches to see if the amount of lampblack could be reduced. Oil gas was made 12 hours a day and water gas the balance of the 24 hours in order to reduce the trouble from low gravity gas on the street experienced in the spring. It was found that the primary heats could be controlled better, but the secondary heats ran way up and could not be controlled. We also had frequent pitch stoppages in the bottom of the primary scrubber and a good deal of naphthalene in the Feld washer. The Oliver filter operated satisfactorily and it was found possible to burn a mixture of 75 per cent lampblack and 25 per cent anthracite screening on a Coxe stoker under a 500 h.p. boiler and carry the load all right. The CO_2 analysis of the boiler flue gases showed from 2 to 4 per cent higher CO_2 with the mixture than with straight screenings.

Cleaning Wash Box

On November 12 the wash box was opened for cleaning and for this purpose a plate is inserted through the cleanout door of the gas offtake to reduce the draft through the secondary. On opening this door it was seen that the arches supporting the secondary make checkers had sagged, the center ones about 15 inches from the original line. All other arches were then inspected as far as it was possible to do so and appeared to be in good condition. In order to continue gas making it was decided to build a fire brick pier supporting all the secondary make checker arches from the checker brick below them. The seal of the wash box dip pipe was also increased at this time to the original 13 inches. Gas making was again resumed on November 15.

The increased depth of seal has eliminated pitch stoppages in the primary scrubber, but the pier built under the secondary make checker arches has apparently caused a large deposition of lampblack at this point so that it has been necessary to clean out lampblack through the door on gas take off several times. The Feld scrubber has also caused more trouble, due to deposits of naphthalene. Experiments are now being made tried with the introduction of air at the top of the primary generator in place of steam during the run, the object being to increase the gravity of the gas so that oil gas can be made 24 hours per day without a large number of complaints from consumers.

Very Sensitive Process

Our experience with this oil gas set has shown it to be very sensitive and has to be watched very closely as the quality of the gas made will change in an hour or two from such a small cause as the slight increase in the opening of oil spray tips due to oxidation or heat. On the Pacific Coast, where most of the plants have several machines in operation with a number of spare scrubbers, it is not so serious a matter to have one machine or scrubber give out, as it can be shut down and another started.

We realize of course that the ultimate end of any manufacturing process is the result obtained, and would have liked very much to give some results, but due to the various difficulties enumerated we have no definite results to give, this paper being more a report of progress than a report of results.

BASIC GAS PROBLEMS

(Continued from page 178)

company should fail to study, and if possible to carry out.

The Gas Rate

The differential rate for gas, that is, the sliding scale, has apparently come to stay. It is a very fair way to charge for gas, distributing certain of the fixed charges among all customers, and should be a big help in securing additional business.

In an English review of the Baltimore year book for 1923 it was stated that as a result of this type of rate the yearly consumption of gas per domestic costomer in Baltimore had increased from 30,000 cubic feet to 51,000 cubic feet, as against an average of 35,000 yearly for seven of the London suburban

companies, including, however, in their case, the industrial consumer.

Gas companies have been very slow in putting this rate into effect for fear of the political agitation which is almost certain to follow.

It is extremely difficult to explain this rate and the reasons for it by means of a pamphlet or letter, and I am convinced that if we could talk with each one of our customers and explain it to them personally there would be little, if any trouble, as we found in Lowell that people were very fair when they understood the facts.

And, lastly, I want to say that I have great faith in the future of the gas industry. It rests upon a very firm and stable foundation, supplying as it does one of the fundamental necessities of life. Its development and its success depend largely upon our personal efforts. The able men who have guided it to its present position have left to us a responsibility and an obligation. We must take up that responsibility and put our utmost energies into our chosen work, to the end that the great industry which we serve shall go ever forward.

PROMOTING THE USE OF GAS IN INDUSTRY

(Continued from page 182)

this time it is believed that a much more favorable figure will be obtained. The results shown have proven that the investment of over $6,000 in modern, efficient heat-treating equipment has been warranted.

When installations are made in a manner that tends to increase materially the profits of the concern buying the gas there is not much danger of high bill complaints and the consumer has an open mind when it comes to suggesting gas for other processes. He is always willing to consider any proposition which promises to lower the cost of production and thus to increase his profits.

Automatic Furnace

Wherever it is possible to install an automatic furnace or other gas-heated appliance, this should be done. Every automatic operation reduces labor cost, makes the product more uniform, reduces waste and materially increases production. For this reason the industrial gas engineer needs to study with the greatest thoroughness and the greatest care the possibilities of making each particular process an automatic one. Before any old equipment, now in a plant and using some other form of fuel, is adapted to the use of gas, the industrial gas engineer should make certain that the adapted old equipment will meet the needs.

Adapting the old equipment, though it may result in a material saving as far as first cost is concerned, may not be fair to gas. It may mean that the gas bill will be compared with the old fuel bill to the disadvantage of gas. On the other hand, even though the installation cost may be materially higher, if, through the use of gas, improvements can be made in the process, there is more to compare than the old and the new fuel bills and the comparison is much more certain to be highly in favor of gas.

Training the Gas Engineer

Your industrial engineers are among the most important men on your staff. First of all the industrial engineer should know gas. Experience at the works and in other departments of the company so that he understands gas thoroughly seems important. The more he knows about the chemistry of combustion the better. Some technical training, at least as much as he can get by attending the classes at Tech, is important. If there can be added to this actual, practical experience in some shop or factory in order that he can gain an appreciation of what the different processes of manufacture really mean, so much the better.

Vision and Imagination

Most important of all, the industrial gas salesman must possess personality, vision and imagination. The man who cannot picture in his mind a way of greatly improving each process requiring heat by making the right application of gas isn't going to make the best applications. The man who cannot visualize a city free from smoke and soot because all heat required comes from gas, is going to find it difficult to get into the state of mind necessary to arouse the enthusiasm which is going to make a difference in many cases between closing and losing a sale. Unless a man has imagination and vision the work is not likely to appeal to him strongly enough to keep him at it year after year and make him a permanent industrial gas salesman. He must be able to see the great service he is rendering to mankind in order to have the courage, the energy and the enthusiasm to keep everlastingly at it, to keep always thinking of gas and to convince those with whom he talks.

Enthusiasm Is Necessary

It has been this vision and imagination more than anything else that has sold all the electric power in use today. If those men who started out some twenty years ago to sell electric current for power purposes had not the vision and the imagination to see a completely electrified world, it is quite certain they would not have succeeded in selling all the power they did. Today, in the gas industry, we need men as industrial salesmen who have the conviction that the day is rapidly approaching when not only will not fuel, but gas, be burned outside the gas plant, but that it will be considered a crime to burn anything but gas. We need men who are sure the day will come when the steam boiler at the central stations will be fired with gas, when every residence and commercial and industrial building will be heated with gas, when every process dependent upon heat will utilize gas, when the air in the city will be as pure and fresh as that in the country, the health of the people will be improved because of the perfect heating conditions prevailing in homes, places of business and of production, and when no particle of smoke or soot will rise from a single chimney in any city.

THE NATURE OF MIXED GAS

(Continued from page 188)

the first of the three fundamental reaction equations given above. This means that for every molecule of carbon that is gasified, there will be obtained 29.45 calories. Per kilogram of carbon there will then be gained $29.45 \times \frac{1000}{12}$, or 2,454 calories.

A part of this heat is, of course, lost, due to radiation, and another part in the form of sensible heat in the gases produced. In the case of large generators this loss is not more than 10 per cent of the thermal value of the combustible. Thus, if the loss is assumed to be 10 per cent of the thermal value of carbon, or 8,133 calories, then the following heat balance can be drawn up:

	Calories
Heat evolved in the producer.....	2,454
Heat lost	813
Heat remaining for the decomposition of the steam	1,641

But in order to decompose a kilogram of steam at a temperature of 100 degrees there will be required the following number of calories:

$$(58.2 - 0.8) \times \frac{1000}{18}, \text{ or } 3{,}188 \text{ calories.}$$

In this equation 58.2 is the heat necessary to decompose one molecule of steam at a temperature of zero degrees C., 0.8 is the heat necessary to bring the steam from that temperature to 100 degrees C. and 18 is the molecular weight of steam. Thus the heat that is available above will be able to decompose 0.515 kilogram of steam $(\frac{1{,}641}{3{,}188})$.

Thus, in the case under consideration, it will be possible to introduce no more than 515 grams of steam for every kilogram of carbon that is being oxidized without any danger of extinguishing the generator. It is also calculated that the ratio of the quantity of air and quantity of steam used in the producer will be as one is to twelve.

Correction on a Practical Basis

But, of course, this figure is theoretical, for in the calculations no account was taken of the quantity of carbon dioxide that is contained in the air. This content of carbon dioxide allows a greater amount of steam to be used than what is indicated above. The quantity of steam that can be used in the operation of the generator therefore depends on the proportion of allowable carbon dioxide in the gas.

Properties of the Mixed Gas

There is no doubt but that the gas that is made in this manner possesses decided advantages of its own and the properties of this gas have been studied by various investigators. The following tabulation shows the composition of various types of the gas and the quantity of steam that was used in making them:

No. gas	Steam per kilogram of coke	Volumetric composition CO_2	CO	H_2	N_2
1.	0.00	4.6	24.2	3.3	67.9
2.	0.510	9.	17.6	9.1	64.3
3.	0.660	8.3	19.3	12.2	60.2
4.	0.710	9.	18.4	12.9	59.7
5.	0.750	13.2	14.6	14.	58.2
6	0.920	14.8	11.7	16.3	57.2

Discussion of Results

The table shows clearly that the hydrogen in the gas increases as the amount of steam used in the process increases, while the nitrogen decreases as well as the carbon monoxide and the percentage of carbon dioxide, on the other hand, increases. The variation in the percentage of carbon dioxide with the amount of steam used is not as regular as in the other constituents of the gas, and this indicates that the composition of the gas that is produced in the generator does not depend entirely on the quantity of air and steam that is introduced, but also to a large extent on the thickness of the fuel bed, the size of the particles of fuel as well as in the attention that is given to the apparatus during the gasification process. These conditions are difficult to maintain constant for any prolonged period of time.

The figures in this tabulation also show that when a variable quantity of steam is introduced into the apparatus in the course of its operation, the sum of the percentages of hydrogen and carbon monoxide passes through a maximum. According to the experiments which have been made by Dr. Bunte on this subject, this maximum took place in the case of gases number 3 and number 4, with 660 and 710 grams of steam per kilogram of coke in the generator. It is evident that these weights of steam are not absolutely fixed, for they depend on the percentage of ash in the coke, the quantity of incombustible matter in the cinders, etc.

Heat of Formation of Gas

An interesting calculation in relation to the manufacture of mixed gas in gas generators is the determination of the heat of formation of the gas per cubic meter. This is equal to the sensible heat in the gas and is equivalent to the heat that is generated during the combustion of the carbon that it contains—burning to give carbon dioxide and carbon monoxide—diminished by the quantity of heat that is absorbed by the decomposition of the steam.

Carbon in burning to carbon dioxide, according to the quantity contained in the gas, shown above as sample number 1, will yield 201.05 calories per cubic meter. The heat produced in burning carbon to carbon monoxide will be 304.00 calories, which will give a total of 505.05 calories, from which must be subtracted the heat consumed in the decomposition of the steam, or 0.57 molecule of steam times 58.2, or

33.17, the difference being 471.88 calories, which is the heat of formation. This, added to the latent heat, 825 calories, gives a total of 1,297 calories as the sensible heat contained in one cubic meter of the gas.

(The author at this point carries out a number of calculations to determine the temperatures of combustion that are obtained in burning the gas when it is mixed with air at a temperature of zero degrees C., when it is mixed with air at a temperature of 1,000 degrees C. and when both the gas and the air are at the same temperature of 1,000 degrees C. The gas considered is designated by sample 1 in the above tabulation. It is found that when the temperature of both the gas and air is at 1,000 degrees C., the temperature of combustion is 2,080 degrees C., but when only the air is preheated to 1,000 degrees C., the temperature of combustion is 1,650 degrees C., and when both air and gas are cold, supposedly at zero degrees C., then the temperature of combustion is found to be 1,350 degrees C. This clearly indicates the value of preheating the gas. Considerable data is also given in the study to determine various other characteristics of the gases and the results that were obtained are summarized in the following tabulation):

No. of gas	Steam per kg. coke in gms.	Analysis				One cu. meter contains			Total heat cal.	Temp. of formation of gas	Wt. of cubic meter of gas in kgs.	Calorific power	
		CO_2 p.c.	CO	H	N	C. gms.	Steam gms.	Sensible heat cal.				Per cu. meter	Per kg.
1	0	4.6	24.2	3.3	67.9	155	0	472	1297	1335	1,249	825	661
2	510	9.	17.6	9.1	64.3	143	35.85	391	1108	1050	1,218	775	638
3	660	8.3	19.3	12.2	60.2	148	42.12	305	1211	832	1,172	907	768
4	710	9.	18.4	12.9	59.7	147	42.84	305	1203	828	1,168	898	769
5	750	13.2	14.6	14.	58.2	149	43.38	410	1221	1050	1,186	811	684
6	920	14.8	11.7	16.3	57.2	142	45.63	380.2	1165	980	1,170	782	668

Temperature of combustion			Utilization of fuel					Volume of flue gas per kilogram of C. burned
Gas and air			In gas apparatus		Total		Steam completely	
Air and gas cold	Air at 1,000 deg. C.	at 1,000 deg C.	gas cold cal.	gas hot cal.	Gas cold cal.	Gas hot cal.	decomposed per cent	in cubic meters
1350	1650	2080	5329	8377	5329	8377	...	10,006
1238	1527	1979	5419	8156	4995	7516	77.9	11,036
1330	1640	2050	6109	8161	5504	7352	78.5	11,327
1307	1628	2061	6097	8165	5453	7303	79	11,548
1240	1538	1966	5425	8173	4823	7264	80.2	10.876
1211	1491	1936	5492	8133	4763	7097	91.1	11,345

Conclusions

The highest temperature of combustion is obtained theoretically with an air gas and it is with this gas that it is possible to obtain the highest temperature in practice. Then when the gas is used in the cold, the most heat is obtained with the gas that is dry at the same time. Cold producer gas is not generally used in the heating of furnaces, but in the production of energy in gas engines. Hot gas possesses considerable advantages over cold gas, as has been seen above.

Advantages of Mixed Gas

On the other hand, mixed gas possesses certain important advantages. The lowering of the temperature within the combustion zone in the producer is known to be one advantage in that the excessive heat is not permitted to injure the grate and at the same time fusion of the ash is prevented. Furthermore, the introduction of steam facilitates the cleaning of the generator, and under certain conditions it really is indispensable for this purpose. It is an important matter, for the efficiency of the generator will depend to a large degree on the cleanliness of the same as far as accumulations of ash, tarry matters and the like are concerned.

Furthermore, the introduction of steam into the generator permits the use of high ash fuels in the apparatus, and also fuels which contain fusible ash, whose use for gas making by the straight producer gas method would be fraught with many difficulties.

The introduction of steam into the producer also results in an augmentation of the production of gas from the apparatus, for when straight producer gas is manufactured it is found that the formation of fused ash on the grate and immediately above it results in stopping up of the flow of air through the fuel bed with a corresponding reduction in the productive capacity of the generator. While it is true that the introduction of steam lowers the temperature of the gas-making apparatus, nevertheless it accelerates the activity of combustion and therewith the production of gas.

Current Market Prices

COALS (By Courtesy of Coal Age)

A. Bituminous.

(Spot prices, F. O. B. mines, net tons)

High Volatile, Eastern Pool 54-64	Market	Price
(Gas Standard)	New York	$1.40 to $1.65
Pittsburgh screened gas	Pittsburgh	2.30 to 2.40
Pittsburgh gas, mine run	Pittsburgh	2.00 to 2.25
Kanawha lump	Columbus	2.25 to 2.75
Kanawha mine run	Columbus	1.50 to 1.70
West Virginia lump	Cincinnati	1.85 to 2.30
W. Virginia gas, mine run	Cincinnati	1.25 to 1.40
Midwest		
Indiana 4th vein lump	Chicago	3.00 to 3.25
Indiana 4th vein mine run	Chicago	2.25 to 2.50
South and Southwest		
Big Seam lump	Birmingham	2.50 to 3.25
Big Seam mine run	Birmingham	1.50 to 2.00
Southeast Kentucky lump	Louisville	2.50 to 3.00
Southeast Kentucky mine run	Louisville	1.25 to 1.75

B. Anthracite

(Spot prices, F. O. B. mines, gross tons)

Market	Freight Rates	Independent	Company
Egg New York	$2.34	$8.50 to $8.75	$8.75 to $9.25
Egg Philadelphia	2.39	9.45 to 9.75	8.80 to 9.25
Egg Chicago (net tons)	5.06	8.17 to 8.40	8.08

COKE (By Courtesy of Iron Trade Review)

Connellsville, furnace	$3.85 to $5.50
Wise County, furnace	$4.25 to 4.50
Alabama, furnace	4.00 to 4.50
Foundry, Newark, N. J., del.	10.41
Foundry, Chicago, ovens	10.75
Foundry, Boston, delivered	11.50
Foundry, St. Louis	9.00
Foundry, Granite City, Ill.	11.00
Foundry, Alabama	4.56 to 5.00

PETROLEUM

(By Courtesy of Oil, Paint and Drug Reporter)

(Prices at wells, per bbl.)

Pennsylvania—Ohio—West Virginia	
Cabell, West Virginia	2.30
Corning, Ohio	2.25
Lima	2.33
Pennsylvania	$3.75 to 3.85
Wooster, Ohio	2.25
Indiana—Illinois	
Illinois	2.12
Indiana	2.13
Oklahoma—Kansas	
Mid-continent (low gravity)	1.35
Gulf Coast	
Gulf Coast, Grade A	2.00
Gulf Coast, Grade B	1.75

GAS OILS

Gas Oil, Bayonne, bulk, gal.	6¼c
Gas Oil (32-36), Oklahoma, gal.	3¾ to 4 c
Gas Oil (32-36), Gulf Coast, gal.	3¾ to 4 c

PIPE AND FITTINGS—CAReview)

(By Courtesy Iron Trade ST IRON GAS PIPE

Four-inch, Chicago	$58.20 to $59.20
Six-inch and over, Chicago	54.20 to 55.20
Four-inch, Birmingham	49.00 to 49.50
Six-inch and over, Birmingham.	45.00 to 45.50
Four-inch, New York	65.50 to 66.50
Six-inch and over, New York.	60.50 to 61.50
Standard fittings, Birmingham, base.	115.00

6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20.

BY-PRODUCTS

(By Courtesy of Oil, Paint and Drug Reporter)

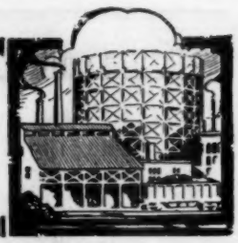
Ammonia aqua, 16 deg. drums, lb.	5 to 5¼c
Ammonia aqua, 20 deg. drums, lb.	6¼ to 6½c
Ammonia aqua, 26 deg. drums, lb.	6½ to 7 c
Ammonia aqua, anhydrous cylinder, lb.	30 to 36 c
Ammonium sulphate, bulk, F. O. B. Works, per 100 lbs.	$2.75 to $2.80
Potash Prussiate, yellow casks.	18½ to 19 c
Potash Prussiate, red casks, lb.	38 to 39 c
Soda Prussiate, yellow casks	10¾ to 11 c
Soda Sulphocyanide, barrels, lb.	45 to 55 c

COAL TAR BASIC PRODUCTS

(By Courtesy of Oil, Paint and Drug Peporter)

Benzol C. P. tanks, works, gal.	23c
Benzol, drums, gal.	28c
Benzol, 90% tanks, works, gal.	21c
Benzol, 90% drums, gal.	26c
Naphthalene, flake, barrels, lb.	5¾ to 6 c
Naphthalene, dyestuff bags, lb.	5 to 5½c
Solvent Naphtha, water white, works, gal.	24 to 25c
Solvent Naphtha, drums, works, gal.	30c
Toluene, C. P. tanks, works, gal.	26c
Toluene, C. P. drums, works, gal.	31c

NEWS OF THE GAS INDUSTRY



Gas Engineers of New England Meet

Annual Meeting at Providence Largely Attended — Comprehensive Program Listened to With Interest

The annual meeting of the New England Association of Gas Engineers was held on Wednesday and Thursday, February 18 and 19, 1925, in the Biltmore Hotel at Providence, Rhode Island.

The meeting was called to order by President Prichard at 10 A. M., Wednesday morning. Nineteen new members were elected at the meeting. The membership is now 288.

President Prichard Reads Annual Report

In his address President Prichard discussed the conditions prevalent in the New England gas industry during the past year. He brought out the fact that coke sales increased last year, and described the various controlling factors governing the sale of this by-product. President Prichard expressed the opinion that the gas industry need not be unduly concerned about an adequate supply of gas oil for gas making purposes.

Many other important phases of the gas industry were touched upon in his address. The industrial and domestic conditions in the New England gas industry were discussed in general detail. Mention was made of the waterless gas holder and liquid purification developments, of the importance of house heating and the relation between the industrial gas business and electrical competition. Gas men were urged to be awake to the fact that electrical competition faces them in obtaining certain forms of industrial gas business. Inspection of industrial burners and furnaces was urged as a necessary step in holding industrial gas users as steady customers.

The importance of advertising as regards a sales program was also mentioned. The matter of public relations, the establishment of home service departments and the differential gas rate were discussed in the importance that they bear to the gas utility.

On closing, the speaker affirmed his faith in the future of the gas industry and in the men who are now engaged in directing the course of the good ship, GAS, to its ultimate goal.

(President Pritchard's address is published elsewhere in this issue of the American Gas Journal.)

Mayor Gaynor Welcomes the Gas Men

The Mayor of Providence was then introduced to the meeting. He extended a hearty greeting to the gas men of New England, who met in this city for the second time in the fifty-five years of the existence of the association, the first meeting having taken place in 1886. These are the only meetings of this association that have been held away from Boston. Mayor Gaynor had some very pertinent remarks to make regarding the relation between public officials and public utility corporations. He indicated that when the gas or other public utility is conducted along proper lines, when it takes advantage of all new developments in the science and art of gas manufacture, distribution and use and makes all effort to secure the utmost economy in gas making, the majority of public officials are glad to see that the company gets an adequate rate. He did not hesitate to express high commendation of the Providence Gas Company and its officials and the fine gas service that this company is giving the people of Providence.

Observations of Mr. Searle on the Gas Business

The meeting then had the privilege of listening to an extemporaneous address by Robert M. Searle, president of the Rochester Gas and Electric Co. Mr. Searle had a great deal to say about various phases of the gas business, but concentrated most of his remarks on the use of gas for house heating. This field was considered by the speaker as the most important available to the average gas company. Many of his remarks on this subject were interspersed with characteristic anecdotes which kept the gas men both interested and entertained.

Customer ownership and protection and the important decisions of the United States Supreme Court regarding valuation of utility property and the establishment of a basis for calculating rates to yield a fair return on the investment were also discussed.

The outstanding remark made by the speaker was that, in his opinion, by the year 1940, gas business will have become more profitable to the investor than the electrical business.

H. N. Cheney Elected President for New Year

The Nominating Committee reported as follows:

For president—H. N. Cheney of Boston, Mass.

For vice-president—F. C. Freeman of Providence, R. I.; and A. J. Smith of Concord, N. H.

Secretary-treasurer—G. L. Tudbury of Salem, Mass.

Directors—G. W. Stiles of Portland, Me.; F. E. Drake of Lynn, Mass.; A. H. Vittinghoff of Haverhill, Mass.; A. H. Scott of New Britain, Conn.; I. T. Haddock of Cambridge, Mass.

Elections were unanimous.

Major Forward Addresses Meeting

The meeting was then addressed by Major Alexander Forward, secretary-manager of the American

Gas Association. Major Forward described the many activities of the association, mentioning in particular the establishment of a laboratory for testing gas appliances, the completion of the gas safety code, the increase in gas sales campaign being conducted by the Commercial Section, the advertising of the industrial uses of gas in trade journals and the recent mid-year Conference of Gas Executives held in San Francisco, California.

Work of the Accounting Section

A very interesting and pertinent account of the work of the Accounting Section was given by Mr. De Witt Clinton of the Worcester Gas Light Company. Among the activities described were the standardization of questionnaires, the work of the statisticians in rendering 1924 gas statistics available so early after the close of the year, the progress in insurance work, bookkeeping without books, etc.

Steam in the Gas Plant

A very interesting paper, read by C. A. Schlegel of the U. G I. Contracting Company, Philadelphia, Pa., was the last item on the morning's program. This paper was particularly concerned with the economy of generation and utilization of steam in the gas works. Tables and curves were given and described in detail. A very excellent discussion followed this paper and, on conclusion of the latter, the meeting adjourned to 2.30 in the afternoon.

Entertainment Features

Through the enterprise of the Providence Gas Co., a fine entertainment program was arranged for the ladies and guests of the gas men. On Wednesday afternoon, there was a tea and bridge in the Home Service Department at the new gas building and also a short talk on Home Economics by Miss Datson, inspector of the department.

An automobile trip was arranged for Thursday morning and the ladies were taken on an extensive tour around the city, including a visit to the famous Roger Williams Park, and the Gas Plant.

On Wednesday night a dinner, dance and entertainment for the members, guests and ladies, were held in the ballroom of the Biltmore Hotel. The music was furnished by the Providence Biltmore Orchestra.

The feature of the entertainment was a histrionic representation of the Story of Gas by employees of the Providence Gas Co. This was in the form of four episodes, as follows:

I. The Birth and Growth of the Gas Industry.
II. Gas—The Silent Servant.
III. If It's Done with Heat, You Can Do It Better with Gas.
IV. The Dawn of a New Era.

Industrial Gas

The first paper read at the Wednesday afternoon meeting was on Promoting the Use of Gas in Industry, by Charles S. Hilton of the Blackstone Valley Gas & Electric Co. of Pawtucket, R. I. In this paper important factors governing the use of gas as an industrial fuel were discussed. The necessity of advertising in telling people what gas can do industrially was emphasized. The qualities that mark out the successful industrial gas salesman and engineer were described. The need of enthusiasm among industrial gas salesmen is essential. These salesmen must have vision and imagination, it was pointed out, and, furthermore, it was shown that without these qualities the industrial gas salesman cannot develop satisfactory industrial uses for gas. It was emphasized in the paper that while gas has been considered a monopoly, it is so from the standpoint of merchandising gaseous fuel, but it is by no means a monopoly in the industrial heating field.

The discussion which followed brought out the experience of various gas companies who made industrial gas applications that turned out successfully. Particular mention was made of experiments on the use of gas directly in the slashing of cotton and the tentering of fabrics in bleacheries.

Post Graduate Courses at M. I. I.

A broad course on gas and fuel engineering has been established at the Massachusetts Institute of Technology. This will be in the nature of a post graduate course. A resolution was presented at the meeting, commending the undertaking. This was adopted.

The New England Gas Association

The discussion of the matter of organizing the New England Gas Association, a combination of the New England Association of Gas Engineers, the Industrial Gas Association of New England and the Gas Sales Association of New England, was started by the reading of a report by H. N. Cheney. In this report, there was outlined a plan for this association which has been agreed upon by the committees of the aforenamed associations. Resolutions were unanimously adopted indicating the assent of the New England Association of Gas Engineers to the formation of the New England Gas Association.

Use of Recording Calorimeter

A discussion was held on the value of the recording calorimeter in relation to operation. It was brought out that this instrument was particularly advantageous in the manufacture of water gas. It was also said that the use of the recording calorimeter will be of paramount importance in helping in the development of the gas industry.

The Oil Gas Plant at New Bedford

The concluding paper of the program on Wednesday afternoon was read by Robert A. Lindsey of the New Bedford Gas and Electric Co., New Bedford, Mass., on the oil plant at New Bedford. The paper was in the nature of a progress report and was illustrated with lantern slides.

Thursday Morning Meeting Devoted to Distribution

The Thursday morning meeting of the New England Association of Gas Engineers was started with the reading of a paper entitled Providence Distribution, 1925, by E. S. Umstead. This paper was constituted of several parts, each prepared by different members of the organization of the Providence Gas Co. The paper was descriptive of the operations of the distribution department of the Providence Gas Co.

Thus, W. H. Brown wrote the part entitled Main Extensions Work, Supply Work; Distribution Department Practice was written

by W. S. Whittemore, W. B. Smith and E. R. Hurst; Meter Repair Shop Practice, by E. L. Bullock; House Pipe Cleaning, by R. Coppage; Stables, by J. A. Walsh; Pressure Taking and Results Obtained Therefrom as per Providence Practice, by R. L. McBride; First Aid and Its Relation to Distribution Work, by G. C. Holland.

A good discussion followed the reading of this paper in which many took part.

The meeting concluded after partial discussion of the question as to the experiences gained in the use of the Backrun as far as operating results were concerned. Another question discussed was the experiences gained with the use of electric welding.

House Heating Problems

A paper was read at the afternoon meeting on House Heating and Its Problems by J. C. Howard of the Blackstone Valley Gas and Electric Co. The paper was a broad discussion of the various phases of house heating that are concerning gas men at the present day. Rates, load conditions and the requisites of salesmanship in selling house heating were considered. The paper was followed by a discussion.

Various committee reports were also read at this meeting. William Gould, chairman of the Sales Quota Committee, read a very important report on the choice of a sales quota on which to base progress in merchandizing, and emphasized the significance of such a basis of comparison. This is a very important matter deserving the attention of all gas men who are concerned with the commercial end of the gas business.

Reports were also read by H. A. Norton, chairman of the Direct Reading Meter Index Committee, and by F. E. Drake, chairman of the Educational Course Committee. A report was also made on the president's address.

Two other matters discussed at the meeting were the use of soft coal in gas generators and the results obtained therefrom, and the advantages of the exhauster type of station meter.

Illinois Power & Light Take on Properties

East St. Louis, Mo.—The Illinois Power & Light Company, according to W. A. Bertke, East St. Louis manager, is optimistic over the future of the territory it now serves and believes that homes and industries will completely fill the territory that now lies between Edwardsville, Collinsville, Belleville, Granite City, Madison, Venice, Brooklyn and East St. Louis.

The plans for serving this territory were made as the result of the acquisition recently of the Granite City and Madison Gas Company. Announcement of the purchase was made on Saturday by Mr. Bertke. Madison and Granite City will be served out of East St. Louis as soon as the Illinois Commerce Commission has passed upon the company's application for approval of the acquisition.

"For the past year," said Mr. Bertke, "the company has been making a survey of the possibilities of adding Granite City and Madison and making appraisals with a view to making it a part of its system. Madison and Granite City are prosperous points.

"The distribution system has been so designed for this territory so that we can supply Edwardsville, Collinsville, Belleville, East St. Louis, Granite City and Madison, as well as Brooklyn and Venice, all out of East St. Louis."

The purchase of the Granite City and Madison Gas Company by the Illinois Power & Light Company has been rumored in the Tri-Cities for some time. A hearing on the application for approval of the purchase was held by the Illinois Commerce Commission in Chicago on Tuesday.

Proposed Merger of New York Gas Companies

The Central Hudson Gas E Electric Co. of Poughkeepsie has asked the Public Service Commission for permission to purchase all of the capital stock of the Citizens Railroad, Light & Power Co. of Beacon, the Fishkill Electric Railway Co. and the Southern Dutchess Gas & Electric Co. of Beacon. It proposes to merge the street railroad properties into the Fishkill Co. and the Gas & Electric properties into the Central Hudson Co.

"The gas, electric and railroad properties in the city of Beacon and in the towns of Fishkill and East Fishkill in Dutchess county, for a number of years have been owned and operated by several interests to some extent affiliated with one another, but represented by various corporate entities with complex inter-corporate relationships which have rendered the administration and financing thereof inconvenient," says the petition. "Central Hudson has agreed to purchase all of said properties and proposes to vest in the purchase all of said properties and proposes to vest in the Fishkill company title to the street railroad property in the city of Beacon and in the town of Fishkill and to vest in itself the gas and electric properties of the Citizens Railroad, Light & Power Company and Southern Dutchess Company, and thus eliminate the present complex inter-corporate relationships in connection with the operation and maintenance of the properties."

Stratton-Cahoon Co. Selected As Agent In Penna. Crusher Co.

The Pennsylvania Crusher Company, Philadelphia, Pa., has recently appointed the Stratton-Cahoon Company, 809 McIntyre building, Salt Lake City, Utah, district agents for the sale of their line of coal preparation machinery.